

Amendment and Response to Office Action
U.S. Serial No. 10/603,572
Inventor: Jason DEAN
Filed: June 25, 2003
Attorney Docket No: 979-002CIP

REMARKS

Claims 1-10 and 21-30 were presented. The restriction requirement has been withdrawn by the Examiner.

Claims 1-4, 6-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,199,000 to Keller et al. (hereinafter “Keller”). Claims 5, 9 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of U.S. Patent No. 5,974,347 to Nelson (hereinafter “Nelson”). Claims 21-23, 28 and 30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of US Patent No. 6,810,324 to Nadkarni (hereinafter “Nadkarni”). Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of US Patent No. 6,459,955 to Bartsch et al. (hereinafter “Bartsch”). Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of Bartsch , and further in view of US Patent Application Publication No. 2002/0019696 to Kruse (hereinafter “Kruse”). Claim 27 was rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of Bartsch, and further in view of US Patent Application Publication No. 2002/0193121 to Nowak et al. (hereinafter “Nowak”). Claim 29 was rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view Nadkarni, and further in view of Bartsch.

Claim 24 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 1 has been amended to more particularly define the features of the compass module. No new matter has been introduced by the amendment.

The specification has been amended by substitution of a new paragraph [00035], incorporating explicitly description from U.S. Patent No. 4,851,775, which patent was incorporated by reference in the original Specification as filed. The first quotation appears at column 5, lines 20-23 of the '775 patent, and the second quotation appears at column 4, line 55, through column 5, line 6 of the '775 patent. Numerical citations to figure elements in the '775 patent have been omitted, so as not to confuse a reader. No new matter has been introduced by the amendment.

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Response to Objection to Claim 24

The Examiner is thanked for indicating the presence of allowable subject matter in the application. As will be discussed hereinbelow, Applicant believes that base claim 1 as presently amended and intervening claims 21 and 23 should also be allowable. Accordingly, claim 24 is not amended at this time.

General Comment on the Detailed Office Action

Applicant notes that the detailed portion of the Office Action is essentially a verbatim reiteration of the detailed action in the co-pending US application serial No. 10/401,266, even though there is an additional limitation in the one independent claim of the present application relative to the one independent claim in co-pending US application serial No. 10/401,266. One other difference is that claim 7 is pending in the present application and claim 7 of the co-pending US application serial No. 10/401,266 was cancelled. Accordingly, the detailed portion of the Office Action in the present application rejects presently pending claim 7 by stating that “As per claim 7, Keller teaches communication means functionally equivalent to [sic] in figure 3.” For the record, pending claim 7 recites “The programmable robotic apparatus of Claim 1, wherein said environmental signal detection module is configured to discern at least one of a location and an orientation relative to at least one of a **cellular telephone communication antenna, a radio broadcast antenna, and a television broadcast antenna.**” (emphasis added) Figure 3 of Keller shows only the communication of “RTK GPS data from Base Station” and “GPS Signals for Satellites”, but does not show, teach, or suggest any of “a cellular telephone communication antenna, a radio broadcast antenna, and a television broadcast antenna.” Keller explains that “RTK” stand for “real time kinematic” and “GPS” stands for “global positioning system.” (See Keller at Abstract) Applicant makes further remarks hereinbelow regarding the inappropriate use of a functional equivalent in order to reject a claim that does not comply with 35 U.S.C. §112, 6th paragraph.

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Response to Rejection of Claims 1-4, 6-8 under 35 U.S.C. §103(a)

Claims 1-4, 6-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Keller. In co-pending US application serial No. 10/401,266, claims 1-4, 6 and 8 were rejected by the same Examiner using the identical argument, claim 7 having been previously cancelled. However, the present independent claim 1 includes an element not found in any of the claims of the co-pending US application serial No. 10/401,266, and this additional element is not addressed in the rejection.

Claim 1 of co-pending US application serial No. 10/401,266 has been amended to recite:

A programmable robotic apparatus, comprising:
a drive system comprising a plurality of independently operable treads;
a control module in electrical communication with said drive system, said control module configured to command the operation of each tread;
a memory module in electrical communication with said control module, said memory module configured to store and retrieve information; and
a compass module in electrical communication with said control module, said compass module configured to discern an orientation of said programmable robotic apparatus, wherein said compass module is configured to discern an orientation relative to the magnetic field of the planet Earth based on an analysis of at least one directional component of said magnetic field.

The above amendment was submitted in response to an interview with the Examiner that took place on May 18, 2005.

Claim 1 in the present application has been amended to recite the language presented below. The added limitation relative to claim 1 of the co-pending US application serial No. 10/401,266 is indicated in **bold** typeface, and was not addressed explicitly in the Office Action mailed on April 12, 2005.

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A programmable robotic apparatus, comprising:

 a drive system comprising a plurality of independently operable treads;

 a control module in electrical communication with said drive system, said control module configured to command the operation of each tread;

 a memory module in electrical communication with said control module, said memory module configured to store and retrieve information;

 an electronic compass module in electrical communication with said control module, wherein said electronic compass module is configured to discern an orientation relative to the magnetic field of the planet Earth based on an analysis of at least one directional component of said magnetic field; and

an environmental signal detection module in electrical communication with said control module, wherein said environmental signal detection module is configured to detect an environmental signal of terrestrial origin that is provided for purposes of communication and to discern at least one of a location and an orientation of said programmable robotic apparatus.

The attention of the Examiner is directed to the holding of the Court of Appeals for the Federal Circuit in *Sextant Avionique, S.A. v. Analog Devices, Inc.*, 172 F.3d 817 (Fed. Cir. 1999).

Applicant respectfully notes that the Examiner has not addressed the claim limitation indicated in bold, which will be referred to hereinafter as “the environmental signal detection module limitation,” and therefore appears to have made a rejection without indicating where and in what art the claim limitation indicated in bold is taught. Plainly, Keller fails to teach or suggest the use of “an environmental signal detection module in electrical communication with said control module, wherein said environmental signal detection module is configured to detect an environmental signal of terrestrial origin that is provided for purposes of communication and to discern at least one of a location and an orientation of said

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programmable robotic apparatus.” Keller describes the use of terrestrial equivalents of GPS satellites (“pseudolites”) as discussed hereinbelow in greater detail, but does not describe “an environmental signal of terrestrial origin that is provided for purposes of communication and to discern at least one of a location and an orientation of said programmable robotic apparatus.” GPS signals are not used for purposes of communication.

The phrase based on an analysis of at least one directional component of said magnetic field finds support in the material newly amended into paragraph [00035] from the '775 patent. In particular magnetic fields have directional components, which can be represented as vectors if one wishes to visualize the field. As is well known from the scientific literature, the directions associated with magnetic fields, for example those of a permanent magnet, can be visualized using magnetic powder, such as iron filings, supported on a sheet of paper and held in proximity with a pole of the permanent magnet. The magnetic powder lines up along the directions of the magnetic field. By comparison, the signal broadcast by a GPS satellite does not involve directional components of fields, but rather uses digitally encoded time signals. The compass module claim element as presently amended now gives a more explicit limitation of how the compass module discerns an orientation of the programmable robotic apparatus relative to the magnetic field of the planet Earth.

Applicant respectfully traverses the rejection previously given as being an improper rejection. However, in keeping with the discussion that occurred in the telephonic interview of May 18, 2005 with regard to co-pending US application serial No. 10/401,266, Applicant is prepared to amend claim 1 as recited in order to more clearly distinguish the claimed invention from the cited art. In particular with respect to Claim 1, the Examiner stated the following in the discussion of the rejection:

Keller does not teach the compass module configured to discern an orientation relative to the magnetic field of the planet Earth. However, Keller teaches another means that perform the same function as the compass. Therefore, they are considered functional equivalent. See *In re Brown*, 459 F. 2d 531, 535, 173 USPQ 685, 688 (CCPA 1972). *In re Mulder*, 716 F. 2d 1542, 219 USPQ 189 (Fed. Cir. 1983). Applicant’s invention uses the compass to discern

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orientation. Indeed, Keller's invention performs the same function with another means such as gyrocompass. Applicant's compass is in communication with other modules as well as Keller's invention. The "magnetic field of the planet Earth" only affects the compass functions, not the whole invention. Keller's invention is not affected at all by the "magnetic field of the planet Earth," because it uses another means (column 4, lines 55-67). Note, the purpose of both inventions is to discern orientation, which it is achieved in Keller's invention (figures 2a and 9b).

The title of Keller is "Methods and Apparatus for Precision Agriculture Operations Utilizing Real Time Kinematic **Global Position System** Systems." (emphasis added) Keller teaches the use of man-made transmitters to allow a device to determine its position with respect to those man-made transmitters, and hence to deduce its location on the Earth's surface. In particular, Keller recites, at column 4, lines 25-54, various man-made systems that are intended for use in the methods taught by Keller. Applicant will refer generally to the systems so described by Keller as "GPS" systems.

Moreover, although the various methods and apparatus will be described with particular reference to GPS satellites, it should be appreciated that the teachings are equally applicable to systems which utilize pseudolites or a combination of satellites and pseudolites. Pseudolites are ground- or near ground-based transmitters which broadcast a pseudorandom (PRN) code (similar to a GPS signal) modulated on an L-band (or other frequency) carrier signal, generally synchronized with GPS time. Each transmitter may be assigned a unique PRN code so as to permit identification by a remote receiver. **Pseudolites are useful in situations where GPS signals from an orbiting satellite might be unavailable, such as tunnels, mines, buildings or other enclosed areas or in areas of significant foliage.** The term "satellite", as used herein, is intended to include pseudolites or equivalents of pseudolites, and the term GPS signals, as used herein, is intended to include GPS-like signals from pseudolites or equivalents of pseudolites. (emphasis added)

It should be further appreciated that the methods and apparatus of the present invention are equally applicable for use with the GLONASS and other satellite-based positioning systems. The GLONASS system differs from the GPS system in that the emissions from different satellites are differentiated from one another by utilizing slightly different carrier frequencies, rather than utilizing different pseudorandom codes. As used herein and in the claims which follow, the term GPS should be read as indicating the United States

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Global Positioning System as well as the GLONASS system and other satellite- and/or pseudolite-based positioning systems.

A pseudolite is a ground-based differential GPS transmitter that simulates the signal of a GPS satellite and can be used for ranging. The word “pseudolite” is a shortened form of pseudo-satellite.

In the text cited above, Keller is clearly contemplating a man-made, artificial system of broadcast data that requires a user to receive information from and to individually identify a plurality of sources of the broadcast data.

Keller teaches the use of additional location systems to supplement the use of the “GPS” systems taught at column 4, lines 25-54. At column 4, line 55, through column 5, line 3, Keller describes these supplemental systems:

In addition, the precision agriculture methodologies and accompanying methods and apparatus described herein **may be supplemented** with non-satellite based guidance systems, such as inertial navigation systems, distance and gyro compass and/or other heading and/or attitude indicator systems (e.g., accelerometer-based yaw, pitch and/or roll sensors), laser range finding and bearing indicator systems, etc. The use of such systems to assist in terrestrial navigation is well known in the art and will not be described further so as not to unnecessarily obscure the following discussion. **It should be recognized that such systems could supplement** (at least to some degree) **the GPS-based systems** described in detail below **and would be particularly useful, for example, in situations where satellite-based positioning signals are unavailable** (e.g., under foliage, behind hills or buildings, in valleys, mines, etc.). (emphasis added)

Keller never explicitly describes the magnetic field of the planet Earth as a suitable signal from which to derive a location or a direction. Furthermore, from the disclosure of Keller cited above, it is clear that “GPS” systems are the primary locating system used in the invention of Keller, and other systems are provided as **SUPPLEMENTAL** systems, and not as the principal navigational system of Keller’s invention. Keller does not teach or suggest how a system would operate without the “GPS” system he uses as the primary locating system, nor does Keller explain how to use such a system in the absence of the primary “GPS” system.

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The argument by the Examiner that “Therefore, they are considered functional equivalent” is an argument that is contrary to the practice of the US Patent and Trademark Office as expressed in the Manual of Patent Examining Practice.

Claim 1 is an apparatus claim having no elements in “means-plus-function” form, as will be explained in greater detail below. Claims that do not invoke 35 U.S.C. §112, sixth paragraph are not entitled to “equivalents” under Title 35 of the United States Code. The “Doctrine of Equivalents” is a judicially created doctrine which was intended to prevent copyists from making insubstantial changes to patented subject matter, and thereby avoiding literal infringement of a claim of a patent. By its own procedures as recited in the MPEP, the United States Patent and Trademark Office (“USPTO”) is not permitted to assert as a sufficient basis for a rejection a mere functional or mechanical equivalent to a claim limitation that does not invoke 35 U.S.C. §112, sixth paragraph. Rather, such an assertion as a reason for giving an obviousness rejection must be based on the fact that the prior art recognizes an equivalence between subject matter in a claim and prior art subject matter.

At MPEP 2144.06, under the heading “SUBSTITUTING EQUIVALENTS KNOWN FOR THE SAME PURPOSE,” the MPEP states:

In order to rely on equivalence as a rationale supporting an obviousness rejection, **the equivalency must be recognized in the prior art**, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. (emphasis added)

Claim 1 as amended recites “said compass module is configured to discern an orientation relative to the magnetic field of the planet Earth based on an analysis of at least one directional component of said magnetic field.” The Examiner is arguing that a GPS module, or a gyrocompass module, which are taught by Keller, make obvious the choice of a compass that discerns an orientation relative to the magnetic field of the planet Earth. Applicant has previously argued that a gyrocompass is an inertial guidance device that does not rely on any external signals or fields at all, but rather relies on the inertia associated with a spinning rotor. Applicant submits that conventional GPS systems have the following attributes: they are digital systems, using a plurality of artificial (man-made) signal sources

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that provide time signals to compute an absolute location relative to the plurality of sources.

- A single GPS source is not sufficient to determine an absolute location of a receiver of the signal from that source in an unambiguous manner. A GPS receiver is not responsive to the magnetic field of the planet Earth in any meaningful way. One can review the disclosure of U.S. Patent No. 5,931,889, issued August 3, 1999 to Misra, and entitled "Clock-aided satellite navigation receiver system for monitoring the integrity of satellite signals," to understand how the identification of a plurality of sources and the received information are utilized in GPS-type systems. Applicant's attorney is familiar with U.S. Patent No. 5,931,889, having been involved in its prosecution.

By comparison, the compass module that is configured to discern an orientation relative to the magnetic field of the planet Earth uses an analog signal, naturally provided by a single source (e.g., the Earth's natural magnetic field), that has no time component, but rather directional components (e.g., vectors), that are analyzed to provide a location and an orientation of a receiver relative to the magnetic field of the planet Earth. The magnetic field of the planet Earth is a substantially steady state analog signal, having a fluctuation time measured in years, if not millennia. The magnetic field of the planet Earth does not come with digital data such as pseudorandom codes as a component part thereof. Applicant additionally submits that the system claimed by Applicant does not require a time base to operate.

The Examiner's argument also relies on two cases, namely *In re Brown*, and *In re Mulder*. MPEP 2183 is the only place in the MPEP where these two cases are cited together. It appears from the Examiner's argument that the Examiner is attempting to apply the equivalence test for a means-plus-function limitation expressed in MPEP 2183 to claim 1.

35 U.S.C. §112, sixth paragraph recites:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. (emphasis added)

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Because the law embodied in 35 U.S.C. §112, sixth paragraph explicitly provides a patentee with coverage to the equivalents of the description in the specification, it is reasonable for the USPTO to examine such equivalents to see whether or not they are known in the prior art.

MPEP 2181 recites the test for determining if a claim limitation invokes 35 U.S.C. §112, sixth paragraph:

A claim limitation will be interpreted to invoke 35 U.S.C. 112, sixth paragraph, if it meets the following 3-prong analysis:

- (A) the claim limitations must use the phrase "means for " or "step for ";
- (B) the "means for " or "step for " must be modified by functional language; and
- (C) the phrase "means for " or "step for " must not be modified by sufficient structure, material or acts for achieving the specified function.

In the present application, claim 1 has no claim limitation that uses the phrase "means for" or "step for." Therefore, all three prongs of the test fail, and claim 1 does not invoke 35 U.S.C. §112, sixth paragraph.

The equivalence test for a means-plus-function limitation expressed in MPEP 2183 recites:

If the examiner finds that a prior art element

- (A) performs the function specified in the claim,
- (B) is not excluded by any explicit definition provided in the specification for an equivalent, and
- (C) is an equivalent of the **means- (or step-) plus-function limitation**,

the examiner should provide an explanation and rationale in the Office action as to why the prior art element is an equivalent. (emphasis added)

Applicant respectfully requests that the Examiner, an employee of the USPTO, follow the guidance published by the USPTO, and not attempt to apply to claim 1 various

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examination criteria that are not appropriate to the choice of claim language used by the Applicant to express his claim. Had the Applicant desired to express his claim in terminology that would invoke 35 U.S.C. §112, sixth paragraph, he would have done so.

Because Keller fails to teach or suggest “a compass module in electrical communication with said control module, said compass module configured to discern an orientation of said programmable robotic apparatus, wherein said compass module is configured to discern an orientation relative to the magnetic field of the planet Earth based on an analysis of at least one directional component of said magnetic field,” or “an environmental signal detection module in electrical communication with said control module, wherein said environmental signal detection module is configured to detect an environmental signal of terrestrial origin that is provided for purposes of communication and to discern at least one of a location and an orientation of said programmable robotic apparatus” and because, as explained above, none of the methods or apparatus for locating an object or defining its orientation as taught or reasonably suggested by Keller makes obvious the use of the claimed compass module or the environmental signal detection module of claim 1, Keller fails to anticipate or to render obvious independent Claim 1 as presently amended. Applicant respectfully submits that independent Claim 1 is patentable over Keller. Applicant further submits that all of claims 2-10 and 21-30 which depend directly or indirectly from independent Claim 1 are patentable as depending from an allowable base claim, because dependent claims include every limitation of any claim from which they depend.

Response to Rejection of Claims 5, 9, 10, 21-23, 25-30 under 35 U.S.C. §103(a)

Claims 5, 9, 10, 21-23, and 25-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Keller in view of one or more other patents or published patent applications.

Applicant has hereinabove explained why the application of Keller by the Examiner to render obvious the limitation of Claim 1 that recites “a compass module in electrical communication with said control module, said compass module configured to discern an orientation of said programmable robotic apparatus, wherein said compass module is

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configured to discern an orientation relative to the magnetic field of the planet Earth based on an analysis of at least one directional component of said magnetic field" (hereinafter "the compass module limitation") appears to be inappropriate according to the guidelines set forth by the MPEP. In addition, the environmental signal detection module limitation has not been addressed by the Office Action. Accordingly, since the limitations are understood to be present in every dependent claim by 35 U.S.C. §112, fourth paragraph, Applicant respectfully submits that the Examiner has not presented a proper rejection for any claim that depends from claim 1, if such rejection relies on Keller for making obvious the compass module limitation and the environmental signal detection module limitation. Accordingly, Applicant respectfully submits that all of dependent claims 5, 9, 10, 21-23, and 25-30 are allowable, because the Examiner has yet to present a suitable rejection for the compass module limitation and the environmental signal detection module limitation.

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CONCLUSION

Applicant has amended claim 1 to more particularly define the features of the compass module. Applicant respectfully requests that the application be reconsidered and that the rejections of Claims 1-10, 21-23, and 25-30, and the objection to Claim 24, be withdrawn. Applicant submits that Claims 1-10, and 21-30 are now in proper condition for allowance, and requests the issuance of a Notice of Allowance at the Examiner's earliest convenience.

If the Examiner believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, the Examiner is requested to call Applicant's attorney at the phone number noted below.

Respectfully submitted,
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